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force of the glacial upheaval. At the residence of R. J. Harney on the bank of the lake, the ice broke down and destroyed a large number of valuable fruit trees and serious fears were at one time entertained that the house would be carried away.

Hundreds of spectators have visited the shore to look at the immense pile of ice which is now melting in the sun's rays.— I. A. Lapham, *Milwaukee.* — *From the Oshkosh Northwestern.*

ANTHROPOLOGY.

Fossil Man in France. — We have a great find here — Mr. Revière of Paris has been carrying on excavations in a bone cave here for all the past winter, digging it completely out. He has at last obtained a nearly complete skeleton, skull perfect, of a large sized fully grown man, at a depth of about ten feet in the accumulated debris of the cave, and the bottom is not yet reached. Its position tells of probable burial, but at that depth it means something. The skull is well formed, judging from photographs before me. — S. H. Scudder, *Mentone*, *France.*

MICROSCOPY.

Deep-sea Life. — One of the latest contributions to our knowledge of this comparatively new branch of science, comes in the form of a Report on the Cruise of the School-ship "Mercury," in the Tropical Atlantic Ocean. The commissioners of public charities and corrections of New York, desiring that the practice voyages of the above named ship, which is used as a reformatory and nautical school for a part of the vagrant boys under their care, should be made also useful to science, furnished instructions and apparatus for taking a series of observations, including deep-sea soundings, between the coasts of Africa and of South America, during the early months of 1871. The microscopical interest of the voyage belongs to the fifty samples of sea water, partly from the surface, and partly from a variety of depths, brought up by means of a water collecting cylinder attached to a sounding line, and to the specimens obtained on fourteen occasions from the bottom, by means of Lieutenant J. M. Brooke's detaching apparatus. Professor Henry Draper's excellent and suggestive report, though devoted mainly to depths, currents, temperatures, etc., presents the following in regard to organisms: "It needed no special proof that organic matter was present in every one of these samples, for the clearest of them contained shreddy and flocculent material, some of them quantities of seaweed in various stages of decomposition. With these vegetable substances were the remains of minute marine animals. As bearing upon this subject, I found, on incinerating the solid residue of a sample of water taken from two hundred fathoms, that the organic and volatile material was not less than eleven per cent. of the whole. Though the quantity of organic substance diminished as the stratum under examination was deeper, there still remained a visible amount in the water of four hundred or five hundred fathoms. It is probable, therefore, that even at the bottom of the ocean such organic substance may exist, not only in solution affording nutriment to animals inhabiting those dark abysses, as Professor Wyville Thompson has suggested, but also in the solid state. Plants, of course, cannot grow there, on account of the absence of light." The spectroscope revealed no hitherto-unknown element in these waters. Dr. Carpenter, to whom were transmitted the specimens of the bottom obtained from the quills of the sounding apparatus, writes: "As far as I can see, they consist of the ordinary Atlantic mud, chalk in process of formation, with the ordinary types of deep-sea foraminifera." The cruise of the Mercury furnishes, in several important particulars, confirmation of theories drawn more or less conclusively from the investigations of the preceding years.

INFUSORIAL LIFE.—Dr. J. Dongall, of Glasgow, in his recent experiments on this subject, has reached some rather novel and probably useful conclusions. Of the various substances used to prevent the development of animalcules, etc., in vegetable and animal infusions, he found the metallic salts to be by far the most powerful, sulphate of copper standing at the head of the list. The organic acids were decidedly less efficient; and carbolic acid occupied the fifth place, not the first. Last followed the alkaline earths, which were all very low except bichromate of potash. It would seem to be the tendency of these facts to show that for many purposes of disinfection, sulphate of copper would be most eligible; and that chromic acid and bichromate of potash are better than the fashionable carbolic acid.

THE NATURE OF MIASM.—M. Bolestra has reported his researches upon this subject, to the French Academy of Sciences.

The water of the Pontine Marshes, and of similar malarious regions, he found to contain invariably, along with the common infusoria, a minute algoid vegetation with an abundance of transparent, greenish-yellow spores, $\frac{1}{1000}$ mm. in diameter. This vegetation develops slowly in pure water and at low temperatures, but rapidly in the heat of the sun and amid decomposing organic material. It floats upon the water, giving an iridescent film when young, and its spores are found in the air near the marshes, and even at Rome, being most abundant in warm weather and after a rain or during a fog, and least so in a cool, dry atmosphere. Dr. Bolestra regards these spores as the miasmatic agent in the production of the intermittent fevers for which the localities are badly celebrated. That "miasm," the hitherto unknown cause of intermittent and remittent fevers, is a form of cryptogamic vegetation, was urged about six years ago by Professor J. H. Salisbury, M.D., of Cleveland, Ohio. He published in the "American Journal of the Medical Sciences, in January, 1866, an elaborate paper, proposing and sustaining this theory, and describing a number of vegetable organisms not very unlike those of M. Bolestra's paper.

"Eels" in Paste. — Many young microscopists have been puzzled to obtain these curious and amusing creatures which the books represent to be of universal presence in sour paste. F. K. explains in "Science Gossip," that the paste must be made of pure flour and water, boiled, and quite thick. It must be stirred every day with a wooden spoon, and the "eels" will appear in a few days in warm weather, but after a longer time in cold. The supply may be kept for years by adding a little fresh paste occasionally.

The Origin of "Guano." — The accepted theory of the nature of this familiar fertilizer was combated by Professor A. M. Edwards, at a meeting of the New York Lyceum of Natural History. He considers it a sediment, consisting of both vegetable and animal organisms, which formed at the bottom of the sea and was subsequently elevated as well as chemically changed. The perfect preservation of the diatomaceous shells is adduced as evidence in favor of this theory.

Arborescent Silver. — The beautiful specimens known by this name may be easily produced by the following method which is gleaned from "Science Gossip." A drop of a very weak solution of nitrate of silver is placed on the centre of a slide, and a piece of fine copper or brass wire, suitably bent, is placed with one end on the slide in the centre of the drop and the other end lying firmly on the table. Crystallization commences immediately, and when it is sufficiently advanced the wire is removed, the remaining liquid poured off, and the crystals washed with a drop of distilled water (containing a trace of gum to fix the crystals on the glass) and mounted dry in a cell. The time required to obtain the best results will be learned by a few trials, and a variety of specimens may be obtained by varying the strength of the solution or the size of the wire.

ARTIFICIAL FOSSILS. — Metallic casts, preserving perfectly the microscopic structure of the wood, may be formed by the deflagration of nitrate of silver on charcoal. The process, as described by Dr. Chandler, consists in directing a blow-pipe flame upon a piece of charcoal upon which a crystal of the nitrate is lying. When deflagration commences, crystals may be successively added, and the silver, as reduced, replaces the particles of charcoal until a perfect copy, in metallic silver, is produced.

NOMENCLATURE OF OBJECTIVES. — The following remarks are suggested by the points discussed in Dr. Ward's paper on this subject in the March number of the NATURALIST. Dr. Ward well says of the prevailing practice. "To call two lenses of identical magnifying power respectively one-fourth and one-sixth inch lenses, is just as indefensible as to call two houses of equal height, forty and fifty feet high respectively." An apt illustration of this is afforded by Dr. J. J. Woodward's paper in the April number, where he cites an instrument invoiced $\frac{1}{30}$, which by actual measurement at the 'open point' was only a $\frac{1}{18}$? But other objectives by the same maker called $\frac{4}{10}$, are known to be nearly as short focus as $\frac{1}{4}$ or less than $\frac{1}{3}$, showing that no system is used in the nomenclature. Other instruments from other makers have given similar results. With such discrepancies, and confusion, microscopists have nothing to depend on in ordering or comparing their instruments.

The points from which the measurements are to be made is the question which is most obscure. Undoubtedly the best, and the true theoretic plan is to measure from the optical centre of the objective to the optical centre of the ocular, or the conjugate focus. This is the method of one maker of objectives. Practically it is next to impossible to apply the rule with mathematical exactness. Mr. Cross says, "because the compound objective has no optical centre;" but this is an error; several lenses combined must have an optical centre as truly as a single lens; but the difficulty is to find its place among the lenses first, and then to find where that place is on the outside of the tube. But for high power objectives it is so near the point between the front and middle combinations, that if that point is taken, there can be hardly an appreciable difference from the truth in the result. The optical centre of the ocular is the diaphragm, if that is in the place where it should be.

But in the modern objective the optical centre is a movable point by the collar for cover adjustment. The nearer the lenses are brought together the more the combination magnifies. Shall the objective be named at least power, or some other. I say the least, because it is a fixed point, always to be found; because it represents the least the instrument can do, and the owner knows that the power increases from that point; and because it seems to have been adopted in theory by most of the best makers, as but few of their *medium* powers have ever been found "over named." If they did not proceed on that principle, their objectives were still farther from what they were named than they have been found to be by that rule. It would certainly be desirable that makers should give the minimum as well as the maximum of focus for each objective. The practice of most makers seems to have been to make certain lenses by rule of thumb, *to be* called *e. g.* a fourth, put them together, give them the name, and sell them without any test of what their real focus should prove to be.

Angular aperture varies also with the change of cover adjustment, and the practice is to give that at its maximum only; Tolles, now, however, gives and marks sometimes both maximum and minimum. Dr. Ward suggests that it should be given at the same point as the name. It is usually at the minimum there; but it may be anywhere else; Tolles can make it the maximum at open point.

The question has been raised in regard to objectives with two front lenses, interchangeable, of different powers, as to what they should be called. Obviously they are practically two instruments, and should have the names proper to each front. This may be illustrated thus: Tolles will make an objective dry $\frac{1}{10}$, and to that put another front $\frac{1}{20}$ immersion, would it not be preposterous to call the performance of the immersion front that of a $\frac{1}{10}$? His practice is to give two names; and as the originator of the plan of two fronts, he may have the right to fix the rule of nomenclature. — C. S.

CORRECTIONS TO PROF. TUTTLE'S PAPER IN MAY NATURALIST. In all the figures save the first, the secondary flagellum is represented as arising a short distance from the base of the first, instead of from the same point with it, which is what I *meant* to indicate in the drawings. The name of the genus which should have been *Uvella* is given as "Urella." The specific name near the bottom of page 286 should be *glaucoma*. — A. H. T.

NOTES.

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE: — We understand that the Committee having the next meeting in charge are unable to make any announcement of arrangements until they hear from the Local Committee in San Francisco.

NATURAL HISTORY EDUCATION AT HARVARD UNIVERSITY: — The changes which have been made in the departments of Natural History at Cambridge within the last two years have been very great, greater perhaps than in any other school within the same time. As there are many persons of both sexes who are seeking opportunities for study such as the University now offers, we give a sketch of the plans of education in the different schools as far as they concern the student of natural history. There are five schools in the University where natural history is taught; the College, the Museum of Comparative Zoology, the Botanic Garden, the Scientific School and the Bussey Institution. Let us trace in a general way the course of a student in these departments.

The student who enters the college to-day is no longer compelled to follow the one uniform road over which the boy of twenty years past had to go; after his first or freshman year he may begin to turn himself into the paths of natural science. At the commencement of his second year he may begin his studies by courses which lay the foundations of a knowledge of chemistry, taught in the Laboratory, of Physical Geography, Geology and Meteorology taught by text-books, lectures and excursions in the field. The time allowed for these studies during this year, is es-